each sub task for an update on their respective state data, the supervisor task examines the new information and initiates a reflexive response action if so dictated by the new information. For example, after querying the sub tasks the belt task's state indicates that the belt has become stuck for some reason. This condition would be discovered by the belt encoder failing to increment, a condition which would be noted by the belt task and the belt task state updated appropriately. This fatal error condition would initiate a preprogrammed response by the supervisor task, which would then effect a controlled but immediate shut down of the screening process and an alarm message generated for the user interface.

[0117] Accurate identification and droplet tracking of a particular sample droplet as it passes through the system can be advantageously incorporated into the high throughput processing system. The droplet tracking system may include a run time database that maintains a data-structure updated at a regular and constant rate which tracks the position of all drops as they pass through the system. Based on this tracking, information about particular drops can be forwarded to, and may act as a trigger for, other system elements that perform some operation on particular drops when they arrive at particular positions along the belt. For example, the drop tracker may be responsible for triggering the reagent dispensing task to expect a certain drop and to perform its sensing/verification of the drop as well as adding the reagent to that drop.

[0118] **FIG. 23** is a flowchart showing an example of how a droplet can be tracked, in accordance with one embodiment of the invention. At system start up, the operator provides data on the microtiter plates containing the samples to be analyzed during the screening, step **2401**. In various embodiments, each plate has a unique id and the wells on each plate have a unique address. For example, the number 3445-7-8 would uniquely identify a drop from the well at the 7^{th} row, 8^{th} column of plate **3445**. The microtiter plate may be fitted with a bar code sticker and a bar code reader could be integrated into the throughput system to automate the process of identifying individual plates.

[0119] The microtiter plate handling subsystem is then commanded to retrieve and present to the sample dispensing station a particular plate **2402**. Once this is accomplished, the dispensing station is commanded to retrieve and place on the belt a particular row of samples from the plate, step **2403**, and the exact position of the drop on the belt is recorded, as reported by a position sensor, which may be a rotary encoder, step **2404**. In this manner, a fiduciary position for each droplet on the belt is obtained, which may be saved to random-access memory. Particular droplets are then tracked using drop sensors as they pass through the system, step **2405**. The drop sensors are located at known positions relative to the position sensor. Positions of particular droplets detected by the drop sensor(s) can thus be verified against the requisite distance traveled by each droplet as determined by the position sensor, step **2406**. If the sensor fails to register an expected droplet the failure is recorded by the supervisory layer and the droplet is appropriately marked in the data tracking system. Drop sensors may be located at substrate and reactant stations, for example. Additionally, this sensing and recording process may be repeated at the analyzer interface as well. A similar drop-sensing device may also verify the existence of a particular and uniquely identified drop as it is fed to the analyzer. Taken together, the belt position sensor (rotary encoder), and the three drop sensors provide a redundant drop tracking and verification system. Data retrieved from the analyzer may then be correlated with the drop tracking data recorded by the throughput subsystem by recording the belt position of each drops introduction into the analyzer via the analyzer interface.

[0120] Additionally, reactants with known analyzer properties may be inserted at known locations in each microtiter plate to aid in tracking and de-bugging of errors that may occur during the assay process. For example, in screening for inhibitors, some wells in the microtiter plates will either contain no inhibitors (e.g buffer only) or a known inhibitor of the enzyme(s) under study. Measurement of these known cases will serve to detect errors in the fluidic handling or drop tracking sub-system.

[0121] In accordance with one embodiment of the invention, the user interface may be a graphical interface presented to an operator on a standard desktop that is running a windows based operating system. Alternatively, the user interface may be a command line based system. The interface may allow configuration of a screening process which, in some cases, may last up to 10 hours or more. In order to accomplish this the interface must allow a user/operator to enter into the system various types of data, including, but not limited to: how many microtiter plates to retrieve and process; which rows of samples to retrieve from the plate and input to the screening system; names for the data file(s) that are to be generated; and configuration settings for the analyzer, which may include specifying a per sample or per plate granularity.

[0122] In an alternative embodiment, the disclosed method may be implemented as a computer program product for use with a computer system. Such implementation may include a series of computer instructions fixed either on a tangible medium, such as a computer readable media (e.g., a diskette, CD-ROM, ROM, or fixed disk) or transmittable to a computer system, via a modem or other interface device, such as a communications adapter connected to a network over a medium. Medium may be either a tangible medium (e.g., optical or analog communications lines) or a medium implemented with wireless techniques (e.g., microwave, infrared or other transmission techniques). The series of computer instructions embodies all or part of the functionality previously described herein with respect to the system. Those skilled in the art should appreciate that such computer instructions can be written in a number of programming languages for use with many computer architectures or operating systems. Furthermore, such instructions may be stored in any memory device, such as semiconductor, magnetic, optical or other memory devices, and may be transmitted using any communications technology, such as optical, infrared, microwave, or other transmission technologies. It is expected that such a computer program product may be distributed as a removable media with accompanying printed or electronic documentation (e.g., shrink wrapped software), preloaded with a computer system (e.g., on system ROM or fixed disk), or distributed from a server or electronic bulletin board over the network (e.g., the Internet or World Wide Web).

[0123] Although various exemplary embodiments of the invention have been disclosed, it should be apparent to those skilled in the art that various changes and modifications can be made which will achieve some of the advantages of the invention without departing from the true scope of the invention. These and other obvious modifications are intended to be covered by the appended claims.